REMARKS

In response to the Advisory Action issued on September 2, 2008, Applicants make additional amendments to the claims as presented in this document. In order for the Patent Office to fully consider the amendments made in the prior response filed on August 4, 2008 in reply to the Final Office Action dated June 4, 2008, a Request for Continued Examination (RCE) is concurrently filed herewith.

In addition, a new Information Disclosure Statement (IDS) is concurrently filed to submit additional references for consideration by the Patent Office upon filing of the RCE.

In the claims, Claims 8 and 17 have been canceled; Claims 1-4, 9, 18, 19, 21 and 22 have been amended; and new dependent Claims 28-50 have been added. Each amendment or added claim is fully supported by the original specification. No new matter is added.

Reconsideration and allowance of this application are respectfully requested.

1. Improper Rejections in the Final Office Action

The rejections in the Final Office Action dated June 4, 2008 are based on an incorrect reading of the technical disclosure of the cited Flagan reference and completely lack support in the disclosure of the cited Flagan reference. All arguments presented in the prior response filed on August 4, 2008 in reply to the Final Office Action are incorporated by reference here.

The Final Office Action along with the prior office action contends that the disclosed "monotonically increasing

supersaturation profile along the center line of the condensation column 120" and "increasing supersaturation profile from an input end 120A to an output end 120B along the aerosol flow" in the cited Flagan anticipate "a monotonic thermal profile in a stream-wise direction of the aerosol flow in the cloud condensation chamber" as recited in the pending claims at issue, such as the feature of "a thermal control engaged to said chamber to produce a monotonic thermal profile in a stream-wise direction of the aerosol flow from said input to said output in said chamber" in Claim 1.

In this regard, Applicants respectfully suggest that the Patent Office erred in equating "supersatuation" and "thermal profile" as well established in the field of the aerosol science and technology because the "supersatuation" is very different from the "thermal profile" or "temperature distribution or profile" in a cloud condensation chamber.

To clarify this, Applicants direct the Patent Office's attention to the "Background" section of the present patent application. Paragraph [0007] provides:

> *The ability of a particle to nucleate is at least in part determined by the saturation level of the environment, the size of the particle, and the chemical composition of the particle. When the relative humidity exceeds the saturation level where the vapor phase and the liquid phase are in equilibrium, a supersaturation state establishes and vapor begins to condense on surfaces and some particles. At a certain critical supersaturation, when the diameter of a condensation nucleus of a given chemical composition exceeds a critical diameter, the nucleus is said to be "activated." Upon this activation, vapor can condense spontaneously on that nucleus and cause the nucleus to grow to a very large size which is limited only by the kinetics of condensational growth and the amount of vapor*

> *available for the condensational growth. The critical diameter at a given supersaturation usually changes with the chemical composition of the particles. Hence, particles of different chemical compositions can become activated at different sizes. One way to characterize condensation nuclei is to measure the critical supersaturation at which a particle activates. Various cloud condensation nucleus spectrometers have been developed for producing and measuring supersaturations in a desired range.*

Therefore, the supersatuaration is a condensation state and can be affected by the temperature or thermal condition of a chamber. The supersatuaration, however, is entirely different from a temperature profile or thermal profile.

In fact, the description in the cited Flagan provides clear distinction between the supersaturation and the temperature. The text in Col. 4, lines 30-40 in the cited Flagan as quoted above refer to a special temperature profile described in previous section in Col. 4, lines 6-29, as quoted below:

> *One feature of the condensation column 120 is that the temperature difference between two successive hot and cold column segments increases. One implementation maintains the cold column segments 210 at different temperatures that decreases from the input end 120A to the output end 120B while keeping all hot column segments 220 at a common elevated temperature. Alternatively, the cold column segments 210 may be maintained at a common low temperature and the temperatures of the hot column segments 220 are higher than that low temperature and increase from the input end 120A to the output end 120B. In another variation, neither the cold column segments 210 nor the hot column segments 220 are maintained at a common temperature. However implemented, the temperature profile along the condensation column 120 not only changes in an alternating manner between high and low temperatures from one segment to another but the temperature difference also increases in the hot column segments 220 from the input end 120A to the*

> *output end 120B. In the embodiment shown in FIG. 2, the condensation column has a total of seven pairs of cold and hot column segments. The temperature difference between the two segments in each pair can be set at 2 °C at the beginning and increases 1 °C per pair. The temperature difference in the last pair at the end 120B is 8 °C..*

Therefore, in the cited Flagan, the temperature profile along the condensation column 120 not only changes in an alternating manner between high and low temperatures from one segment to another but the temperature difference also increases in the hot column segments 220 from the input end 120A to the output end 120B.

This temperature profile that spatially oscillates between high and low temperatures of the hot and cold column segments constitutes the special temperature profile described in Col. 4, lines 30-40 in the cited Flagan as relied upon in the Final Office Action. Notably, according to the cited Flagan, this special temperature profile with the described spatial oscillation can produce a monotonically increasing supersaturation profile along the center line of the condensation column 120.

Therefore, the supersaturation and the temperature profile are very different from each other. The Final Office apparently erred in its rejection due to this incorrect understanding.

2. Improper Contention Made in Advisory Action

In the Advisory Action, the Patent Office contends that:

> *Flagan discloses a thermal control (140) engaged to the chamber (120) which controls the temperature profile along the column(applicant's chamber) and therefore the temperature profiled (sic) can be controlled to produce a monotonically increasing*

thermal profile along the condensation column as disclosed by the claimed invention.

See the Examiner's remarks on the continuation sheet of the Advisory Action.

The above contention, however, contradicts the disclosure of the Flagan. Referring to FIG. 1 and the text in Col. 4, lines 30-40 in the cited Flagan, under the thermal control (140), the temperature profile along the condensation column 120 not only changes in an alternating manner between high and low temperatures from one segment to another. This aspect is further illustrated in FIG. 2 in Flagan.

Applicants are at loss in understanding the Patent Office's position that Flagan discloses "a monotonically increasing thermal profile along the condensation column." It is respectfully suggested that the Patent Office to provide specific cites with column and line numbers to show the relevant disclosure in Flagan because the Patent Office has the burden to make a prima facie showing. This burden has not been met and the rejections must be withdrawn.

3. All Pending Claim Patentable over Flagan and Russell

Consider Claim 1 as an example. Claim 1 recites, inter alia, a thermal control engaged to said chamber to produce a monotonic thermal profile in a stream-wise direction of the aerosol flow from said input to said output in said chamber. The cited Flagan does not disclose such a thermal control and discloses an entirely different thermal control scheme.

In the cited Flagan, the cloud condensation nucleus spectrometer has a streamwise segmented condensation nucleus growth column. Notably, the condensation nucleus growth column

in the cited Flagan includes alternating hot and cold temperature-maintaining segments arranged next to one another. See the Abstract and the text in Col. 4, lines 6-29 of the cited Flagan and in the cited Flagan. The temperature profile along the condensation column 120 not only changes in an alternating manner between high and low temperatures from one segment to another but the temperature difference also increases in the hot column segments 220 from the input end 120A to the output end 120B.

This design in the cited Flagan is discussed in the present patent application and is shown in FIG. 1 of this patent application.

This design in the cited Flagan is different from the recited "monotonic thermal profile in a stream-wise direction of the aerosol flow from said input to said output in said chamber" in Claim 1 because the alternating hot and cold temperature-maintaining segments arranged next to one another in the cited Flagan does not produce a monotonic thermal profile in the stream-wise direction and is used to produce a monotonically increasing supersaturation profile along the center line of the condensation column 120 and maintain a desired high spatial rate throughout the condensation column 120 without a significant decay near the output end 120B.

As discussed above, the supersaturation profile and thermal profile are very different from each other. Therefore, Claim 1 is distinctly different from the cited teaching in the cited Flagan in the Final Office Action.

In addition, the device in Claim 1 can be implemented to produce a nearly constant supersaturation along the chamber or a quasi-uniform supersaturation along the flow direction. See,

e.g., paragraph [0011], FIG. 2, and [0023]. This aspect is completely different from the "a monotonically increasing supersaturation profile along the center line of the condensation column 120" in the cited Flagan.

Therefore, Claim 1 is patentable over Flagan. Accordingly, other pending claims are also patentable for the above reason and based on their own merits. For example, Claim 9 as amended now recites the heating system is structured and controlled to produce a monotonic thermal profile in a stream-wise direction of the flow and to effectuate a nearly constant supersaturation along the chamber.

Claim 25 recites controlling a temperature profile of the chamber along the aerosol flow to produce a nearly constant supersaturation along the chamber. The Final Office Action cites Col. 3 and Col. 4 in the cited Flagan to support the rejection to Claim 25. This contention can not stand because the cited Flagan does not support the rejection.

More specifically, in Col. 4, lines 30-34, Flagan teaches:

> *This special temperature profile can produce* ***a monotonically increasing supersaturation profile along the center line of the condensation column 120*** *and can maintain a desired high spatial rate throughout the condensation column 120 without a significant decay near the output end 120B.*

The "monotonically increasing supersaturation profile" in the cited Flagan is different from the "nearly constant supersaturation along the chamber" in Claim 25.

Therefore, Claim 25 is patentable. Accordingly, Claims 25 and 27 are patentable based on the above reason and on their own merits.

The rejections over Russell are also respectfully traversed. To support the rejection, the Final Office Action cites Col. 5, lines 10-18 in the cited Russell. The text in Col. 5, lines 3-18 in the cited Russell is quoted below:

> *A preferred embodiment, the Automated Mobility-Classified-Aerosol Detector (AMCAD), has an alternating dual-bag sampler, a particle charger, an improved differential mobility analyzer (DMA), and a condensation nucleus counter (CNC). The implementation of automated feed back control of flow rates allows the preferred embodiment of the present invention to achieve high-resolution and high precision measurements under changing pressures. The AMCAD also controls the temperatures of the saturator and the condenser in the condensation nucleus counter to achieve consistent high counting efficiency as the temperature of the incoming aerosol sample changes. The adverse effects associated with the humidity level of the aerosol sample are reduced by desiccating the dilution flow that mixes with the aerosol sample flow at the entrance of the condensation nucleus counter.*

The above cited portion of the cited Russell does not disclose "a thermal control engaged to said chamber to produce a monotonic thermal profile in a stream-wise direction of the aerosol flow from said input to said output in said chamber" as recited in Claim 1. Therefore, Claim 1 is patentable. Other claims rejected over Russell are patentable for the similar reasons and for their own merits.

Claims 11 and 15 stand finally rejected under 35 USC 103(a) over the cited Flagan. This contention is respectfully traversed based on the above analysis for Claim 1 because the base Claim 9 of Claims 11 and 15 also cites that "the heating system is configured to produce a monotonic thermal profile in a stream-wise direction of the flow" as cited in Claim 1. Therefore, the rejections must be withdrawn.

Claim 18 stands rejected under 35 USC 103(a) over the cited Flagan in view of the cited Russell. Claim 18 is based on Claim 9 and thus is patentable over the cited Flgan in view of the cited Russell based on the above analysis with respect to Claim 1 in connection with the cited Flagan and Russell, respectively. Therefore, Claim 18 is patentable.

New dependent Claims 28-50 are patentable over Flagan and Russell either separately or in combination based on the above analysis and on their own merits. For example, Claim 31 recites that said chamber has a chamber wall with a selected chamber wall thickness sufficiently large to make heat transfer in the chamber wall along the stream-wise direction greater than heat losses to the aerosol flow and to surrounding of said chamber. Nothing in the cited prior art discloses this. As another example, Claim 32 recites that said chamber comprises an additional cloud condensation nuclei chamber segment that connects to said chamber and has a thermal profile different from the monotonic thermal gradient profile of said chamber. Again, nothing in the cited prior art discloses this.

Therefore, all pending claims presented in this document are patentable.

4. Conclusion

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally,

nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Applicants ask that all claims be allowed. Please apply $598 for excess claims, $555 for the extension of time fee, and any other applicable charges or credits, to deposit account 06-1050.

Respectfully submitted,

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